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A critical and anatomical Examination of the Parts immediately interested in the Operation for a CATARACT; with an Attempt to render the Operation itself, whether by Depression or Extraction, more certain and successful. By SILVESTER O'HALLORAN, Esq; M.R.I.A. Honorary Member of the Royal College of Surgeons in Ireland, and Surgeon to the County of Limerick Hospital. Communicated by the Right Honorable the Earl of CHARLEMONT, P.R.I.A.

Nullius addictus jurare, in verba magistri.

HOR.

THOUGH it has been unanimously agreed on, by both antients and moderns, that the cataract is *an opaque body immediately behind the pupilla, opposing the passage of the rays of light to the bottom of the eye*; and that the cure of this disorder *consists in removing this opacity*; yet the part immediately diseased has been for about a century the subject of much controversy, whilst the operation itself, *the most essential point of enquiry*, seems as uncertain now as it was a thousand years ago, notwithstanding the boasted improvements of M. Daviel, and other moderns.

Read Jan.
3, 1789.

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THE antients supposed that the crystalline lens was the principal seat of vision, which they agreed to place in the centre of the eye; that the space between it and the bottom of the eye was filled by the vitreous humour, and that the aqueous humour occupied the anterior part of this organ. As the iris intersected this last space, they agreed to call *anterior*, or outer chamber of the aqueous humour, the parts between it and the cornea transparent; and *posterior*, or inner chamber, what remained between the crystalline lens and it. The cataract, it was affirmed, was a web or membrane formed immediately behind the pupilla, in this posterior chamber, and far removed from the crystalline, not unlike a scum that is sometimes found on the top of bottled liquors not well corked. But as experience proved that people after the removal of this opaque body by no means saw with that distinctness that might be expected, and that theory and practice might go hand in hand, this phænomenon was accounted for by observing—"That in the formation of this scum or membrane, " the most dense parts of the aqueous humour were engaged, " the remainder of this liquor was therefore rarer, or less enabled " to cause a convergence of the rays of light, and sight must of " course be proportionably weaker."

TOWARDS the decline of the last, but particularly since the commencement of the present century, repeated dissections and observations made it but too evident that the *cataract was not a membrane, but the crystalline lens itself, that was rendered opaque*. Numbers of cases, and many works were published from time to time to corroborate this fact, which were violently opposed by the partizans of the former doctrine; the chief of their arguments,

ments, and for the time the most difficult to be answered, was this—" It is an acknowledged fact that the crystalline is placed in
 " the centre of the eye ; but every oculist knows that the opaque
 " body to be removed lies immediately behind the pupilla, there-
 " fore it must be a membrane between the crystalline and iris."
 This put the advocates for the new doctrine on a closer examination of the structure of the eye, in which Brisseau, Maitre Jean and St. Yves, but more particularly Heister, Morgagni, Petel and Winslow, bore distinguished parts. Every new enquiry contributed to advance the seat of the crystalline more forward, 'till at length, in the year 1729, Doctor Petel published a letter * in answer to some remarks of Hequet's, in which he demonstrated *that the crystalline was so near the pupilla that it was impossible to introduce a cataract needle between it and the iris without wounding it !* And to make clear to every conception this fact, he gave with this letter a figure of the eye, more correct than any that had yet appeared. Still he kept up the distinction of the different chambers of the eye, and in this figure determined their limits, which have been carefully noted by all subsequent writers. But that moderns should appear no more defective in point of theory and optics than the ancients, the limited sight that followed the operation was accounted for by observing, " that the crystalline is
 " a denser medium than either the aqueous or vitreous humour,
 " and of course by its removal sight should be proportionably
 " weaker."

* Sur la vraie situation du Cristalin.

Anatomical Observations on the Structure of the Iris, Situation of the Crystalline, &c.

AFTER names so respectable and truly great as those of Heister, Petel, Morgagni and Winslow, one would naturally imagine that nothing with respect to the structure of the eye was left unexplored ; yet from the following account it will appear that much was still wanting. I shall not enter into a general description of the eye, but on the present occasion confine my remarks to the parts immediately interested in the operation, and to the *errors committed* in the description of them. And first ; much confusion has arisen on account of the two chambers of the aqueous humour, and very reprehensible mistakes in the description and delineation of the iris ; the iris is generally supposed to take its rise from the sclerotica, at its junction with the cornea transparens ; but though this is exactly the case *at the middle of the superior and inferior parts of the eye, as it lies in the orbit*, yet the adhesion of the ligamentum ciliare gradually falls back on the sclerotica, as it advances towards the two canthuses, inasmuch that HERE the origin of the iris is a mathematical line, posterior to that of the cornea transparens ; *a remark of great consequence to the operation, but particularly to the extraction of the crystalline* ; to prove this, if you remove the cornea transparens, at its junction with the sclerotica, you will evidently see that the close adhesion between this last and the choroïdes, called ligamentum ciliare, is exactly as described. The uvea or iris is also represented as proceeding exactly flat, from the edge of the sclerotica to its aperture called
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the pupilla ; yet if we look into an human eye, or into that of any animal, we will clearly see that the iris, so far from being flat, is very convex, and that this convexity is greatest at its sides. If besides viewing closely the eyes of living animals, we examine through the cornea of inanimate ones, we will perceive the same appearance. Certain it is, that after cutting off the cornea lucida, the situation in which the eye is placed being mostly on its posterior extremity, makes the whole eye, and of course the iris, appear flatter than they really are ; but a little reflection, and an alteration in the position of the parts, will soon prove the fallacy of this appearance ; for placing the sides of the eye nearly horizontal (according to their natural situation) you will quickly see the iris assume a much more convex appearance, provided in removing the cornea you have not injured the crystalline capsula, even though the loss of this cornea should have made the parts less compact.

INDEED, from the days of Galen, the convexity of the iris was never doubted, 'till Vesalius first pretended to controvert this truth ; and all the figures given of it by former anatomists and opticians have so represented it, notwithstanding that they agreed to place the crystalline in the centre of the eye. But since Monf. Petel, (already quoted) has affirmed that the iris is flat, and as such has represented it. he has been in this error followed by subsequent writers : Yet that it is an error, and with respect to the *operation of extraction*, a very alarming one, will appear from the following exact description.

THE

THE vitreous humour occupies all the posterior and anterior part of the eye as far as the iris, leaving a small socket or cavity in its anterior part for the lodgment of the crystalline lens. It is said to be covered by a fine membrane, called tunica vitrea; but for my own part, who have dissected as many eyes, and of different animals, as I believe any man, I confess I have never been able to trace any membrane surrounding it except in its anterior part, *and there it is covered very sensibly and very remarkably*. Leaving then the description of this tunica vitrea to those that can find it, I shall observe that when the vitreous humour reaches the iris there is a close adhesion between them by the intervention of a firm pellucid membrane arising from the inside of the choroïdes, exactly opposite to that part where the adherence between this last and the sclerotica commences, called ligamentum ciliare. This membrane covers all the anterior part of the vitreous humour; but when it reaches the socket or cavity in which the crystalline is contained it separates; the posterior, and by much the finer part, lines this socket, whilst its anterior one covers the crystalline, so that it becomes inclosed in it as a nut is in its shell. Thus the crystalline is enclosed in a fine pellucid membrane, which capsula is *constantly* humected with a transparent liquor which prevents any kind of adhesion or connection between it and this interposed body. The anterior part of this capsula is so dense as to be sometimes capable of being separated into two distinct coats; the contained liquor is, from its discoverer, called *Morgagni's liquor*.

I HAVE

I HAVE said, CONTRARY TO ALL ANATOMISTS, that the inside of the iris adheres closely to the anterior part of the vitreous humour, except where it opens for the lodgment of the crystalline; and the better to comprehend this fact, I shall give a new description of the iris. With other anatomists, I always imagined that this last was a real continuation of the choroïdes; I am now satisfied that it is not, and that the assertion is very nearly as absurd as to affirm that the diaphragm is a continuation of the pleura, though the choroïdes adheres pretty closely to the sclerotica, near the insertion of the optic nerve; yet from thence to the ligamentum ciliare, the correspondence is mostly kept up by blood-vessels and nerves passing from one to the other. HERE a close adhesion of the choroïdes to the sclerotica commences. At the middle of the superior and inferior parts of the eye, it begins at the very edge of the sclerotica, bordering on the cornea transparens, but from thence to the two canthuses it gradually retires back on the sclerotica; the adhering part from the choroïdes, called ligamentum ciliare, is truly tendinous, and forms an expansion or covering to the iris; within side this are groupes of blood vessels from the arterial circle of the iris, proceeding in nearly straight lines, as well to the pupilla as to the ciliary ligament. To prove that the iris is totally different from the choroïdes and truly muscular, it is only necessary to observe that the inside of the ligamentum ciliare answering to its breadth, is fleshy and thicker than any other part of this body; its fibres proceed radiated or nearly so from thence towards the iris. Here the covering of the anterior part of the vitreous membrane commences, and so
closely

closely is this attached to these radiated fibres that their impressions are sunk deep into it, and may be called the fulci of the processus ciliares. This first range of fibres on the inside of the iris is in a human eye about the breadth of a line; a kind of tendinous narrow and circular band closes this phalanx, and from thence proceeds a second row of radiated fibres thinner than the first; these also adhere and leave their impressions on the vitreous membrane; and that part of the iris which forms the pupilla is still finer than the last-mentioned, rests on the crystalline, and is quite free from any adherence, by which means it contracts or dilates in proportion to the vicinity or distance of objects. Thus the convexity of the iris follows nearly that of the cornea transparens, and is occasioned by the protuberance of the crystalline; so that the idea of a posterior chamber of the aqueous humour must be FOR EVER BANISHED; nor is that of circular fibres belonging to the iris better founded in truth and anatomy. These last we are constantly told were formed for the purpose of contracting, as the radial ones were for expanding, the pupilla; but not to advert to a fact, which is, that the state of quiescence in the pupilla is its dilatibility, which is evident, because when asleep or in a state of inattention with respect to objects, we constantly find it so; I shall just observe that there are none but radial fibres through the whole internal surface of the iris. That the convexity of the iris may be proved beyond a possibility of doubt, let the side of the cornea be pierced at its junction with the sclerotica by a lancet or cataract needle, and passed in that direction to the opposite side of the eye. On examination you will find, that besides the cornea you will have wounded the
iris

iris a line higher than the ligamentum ciliare. If you perforate another eye a line and an half higher up on the cornea, it will just glide over the pupilla, and from this to the top of the cornea within is another line. If from the summit of the cornea a straight line be drawn, and parallel to one from the rise of the iris, i. e. the ligamentum ciliare at the sides of the eye, the distance will be found to be three lines and an half. Thus the distance between the rise of the iris and the pupilla or its upper extremity is generally two lines and an half, oftener more, measured from either canthus; but from the middle of the superior and inferior parts of the eye, as it lies in the orbit, a line less.

Idea of adherent Cataracts exploded, real Difficulties attendant on depressing Cataracts demonstrated, with the most rational Means of overcoming them.

BRISSEAU, Maitre Jean, Heister, and, in short, all oculists, whilst, as *anatomists*, they inform us that the crystalline is surrounded by a fine pellucid membrane; as *operators*, they are careful to tell us *that the cataract frequently adheres to different parts of the iris*. Heister, though his treatise *De Cataracta* merits high applause, yet seems so persuaded of this imaginary adhesion! that, in his surgery he directs, when it is found so strong as not to be separated by the needle, to perforate the centre of the crystalline, in hopes of giving some small admission to the rays of light. Warner who, we should suppose always paid particular attention to this organ, though he tells us that

the crystalline is invested by a fine membrane from which it readily escapes by the least aperture, yet attempts to determine as an *operator*, whether there be an adhesion of the cataract to the iris or not*, nor can his method of performing the operation of depression be approved of, seeing that he directs the needle to pierce the sclerotica at *a very small distance* from the cornea, by which means the iris must unavoidably be wounded. In a word, the adherence of cataracts has been the language of antiquity, and continues to be that of modern times; but it certainly is not the language of anatomy or reflection, *for it is not the language of common sense*: But before we proceed to explain what has given rise to this imaginary adhesion, the following practical remarks on the different humours appear very reasonable.

AND first, as to the aqueous humour, it is a fact long established, that if, by a wound of the cornea, it escapes, it becomes in a very short time replenished, and the process of extracting the crystalline proves that this regenerated liquor is as well adapted to all the purposes of vision as the former. The vitreous humour, if partly or totally lost, never can be restored; but a wound of this body does not destroy its transparency, nor even injure it, as is demonstrable by the process of couching, which cannot be effected without not only wounding but separating parts of it, and forcing the crystalline through them. A wound

* Description of the eye and its disorders, p. 81, &c.

of the crystalline is constantly followed by its opacity, as numbers of experiments prove, *many of which are within my own knowledge*; and a severe compression of it will produce the same effect. This lens, when fairly discharged from its capsula, and lodged under the vitreous humour, insensibly wastes away*; but *I have had proofs* that when it slips into the aqueous liquor this is by no means the case. A diseased crystalline, whether hard or soft, is constantly found smaller than a sound one, and its capsula or covering, it may be affirmed, *whilst entire*, is always transparent, let the state of its interposed body be what it may. A wound of this membrane soon heals, and though by it Morgagni's liquor may escape, yet it also becomes soon recruited. Both these INTERESTING FACTS are proved by couching; for if you fail of depressing the cataract ever so often, yet you may at length succeed; and though you should fail in this, yet you are certain to remove the opacity by *extraction*, which could never happen did not the different wounds of this capsula heal, and the enclosed liquor regenerate.

WE will now suppose a person presents himself for the operation; the cataract is of a pearl colour, greyish or white; the eye feels plump, the pupilla contracts and dilates, and the patient distinguishes light and darkness; a better conditioned cataract cannot offer, nor a fairer for depression. Let us now see what are the *real*, not *imaginary*, obstacles to the success of the

* Philosophical Transactions for 1730, No. 384.

operation ; the needle pierces the sclerotica, we behold it, through the pupilla, lodged in the crystalline ; the surgeon endeavours to disengage and remove the cataract ; it seems in part obedient to the needle ; as it is pressed down the iris seems to follow it, but lighten the force, and every part assumes its former place and appearance ; you renew your endeavours, and on pressing the cataract below the pupilla, and retaining it there awhile with the needle, the diaphanous vitreous humour follows it, and for the instant enables the patient to see objects ; the needle is now carefully withdrawn, and all parties congratulated on the success of the operation. It is however but transitory, for the parts return to their former situation, and any violence done to the vitreous membrane is removed before the eye is again opened. Let us suppose in the first instance that the operator sees the crystalline rising : persuaded that this is occasioned by its adherences, he freely pricks and wounds the processus ciliares, which are the internal parts of the iris, to break this cohesion ; the hemorrhage disturbs his plan by destroying the transparency of the aqueous humour, and he withdraws his needle *re infectâ* ; or if he perseveres, he may have the credit of destroying the eye in forming this separation. Here are in one view collected all the proofs, *and melancholy ones they are*, of an adherent cataract ; but the description already given will clearly explain them. It is to be remembered, that the opaque crystalline has a lodgment formed for itself in the anterior part of the vitreous humour ; that it is surrounded on every side by a strong membrane, which is a continuation of that which covers the anterior part of this last body ; that the processus ciliares being the inside of the iris
adhere

adhere closely to this membrane in every part, even to the border or edge of the crystalline capsula, to which capsula the cataract has not the smallest adherence; the fossula or bed alone must give some degree of stability to the crystalline; but when to this we add its envelope, the covering of the iris, and its strong adhesion to the vitreous membrane, we must be convinced that nature has paid uncommon attention to the security of this body, and that no small pains and attention are necessary to displace it. Certain it is, that if a sufficient opening were made in the capsula the crystalline may be thrown out of it by means of its contained liquor: But are the small pointed needles, mostly used, well calculated for this purpose? they undoubtedly are not; they perforate this membrane, and stick in the crystalline, which is of a thickish viscous substance, often much harder than in its natural state. Pains are taken to remove this opaque body, but the needle does not afford a sufficient passage for its exit; the parts are pressed down, and the vitreous membrane, and of course the iris, must yield to this pressure, from their connections with each other, without the aid of any imaginary adherence of the crystalline or its capsula to the iris: but let us suppose the cataract fairly dislodged from its bed by a proper opening of its capsula; are there no other obstacles to its precipitation? there are, and considerable ones; the vitreous membrane and its adhesion to the iris oppose it, so does the density of the vitreous humour itself. These are now the real difficulties, and none other. It is for these reasons that the cataract sometimes slips into the watery chamber of the eye, which from its tenuity gives less resistance to it; and it is this circumstance

circumstance that gave rise to Monf. Daviel's method of extracting the crystalline.

To overcome these REAL OBSTACLES, care must be taken, first, by a proper opening of the crystalline capsula, to give room to the discharge of this body ; next, to dislodge it from its socket or bed ; and lastly, to withdraw it to the posterior and inferior parts of the eye, at least to place it below the pupilla. Instead of the needles in use, I have mine flat, pointed, and edged like lancets, and like them gradually encreasing in surface. The length of the incisive part is to its greatest breadth nearly as three to two ; from the broadest part it rounds off gradually, and both the handle and blade are shorter than those of the common cataract needle. With this knife or lancet moistened, the eye (if the left) is to be perforated in the sclerotica, at about two lines distance from the cornea lucida, at the external canthus. If for the right eye, and that the operator is not ambo-dexter, a curvature may be made in the instrument, and the lancet should pierce the eye at the internal canthus, and at same distance from the cornea transparens. Let it advance in nearly a straight line (*for it should have a small inclination towards the pupilla*) and it will then enter into the side of the capsula. The breadth of the instrument alone will give a tolerable opening, which should be encreased by a gentle elevation and depression of the sides (not the point) of the instrument. Push the point after this to the other side of the capsula, which is also to be opened, but without injuring the process ciliares. Sufficient space is now left for dislodging the cataract from its bed, which the surrounding fluid will facilitate ; but if we fail in
our

our endeavours the capsula will heal, and all will be to do over again. To effect this the cataract should be gradually disengaged by gentle and nearly rotatory motions, and insensibly withdrawing it from before the pupilla, which the breadth of the needle seems well calculated for. When you behold it retiring from it, you should gently press it (but with the sides of the instrument) to the bottom of the eye, and there detain it for two or three seconds, or 'till the vitreous humour fills up the deserted place. Though a cataract thus depressed may rise a little, yet as it is effectually removed from its original place, it will insensibly fall again, and melt away; for I am to repeat it, that the success of the operation depends on a sufficient opening of the membrane, and pushing the opaque body from its natural resting place. If the cataract be in a dissolved state, the first perforation will give issue to it; and though it may appear to disturb the other humours, yet in a few days all will insensibly subside, and the eye clear up. There are other instances where the crystalline will be removed with very little trouble to the operator; but this only proves that its membrane is very thin, and the vitreous humour not so viscid as usual. But notwithstanding the directions given to remove the crystalline, if it should still resist our endeavours, and if, by accidentally wounding the iris, blood should follow; in this case, when the operator is satisfied that the capsula is sufficiently dilated, he should immediately withdraw the needle, and press with his finger on the side of the globe opposite the perforation, *and this will effectually dislodge the cataract, without any injury whatever to the eye, provided the pressure is not too violent,* which the forcing out the crystalline does not seem to demand.

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HAVING, I think, effectually exploded the erroneous doctrine of *adherent cataracts*, and given a more exact description of the parts interested in the operation, the true causes of the difficulties that occur in it, and the means of overcoming them, than has hitherto appeared ; I shall now proceed to treat of the extraction of the crystalline, and propose an operation much more simple than that now in use, and attended with infinitely greater advantages to the patient.

Of extracting the Crystalline.

WOUNDS of the cornea have been long known to be attended with no danger or inconveniency, except from the cicatrice obstructing the rays of light ; for the aqueous humour is soon restored. Pieces of the crystalline have been often known to pass into this chamber, and to be sometimes extracted by incising the cornea ; instances of which are given by Mery, Petel and St. Yves ; and, encouraged by this success, Mery proposed to the academy the extracting the cataract by an incision of the cornea, as a certain cure *. It does not however appear that he ever reduced it to practice ; and whatever applause is due to this method, M. Daviel is certainly entitled to it. He pierced the cornea nearly in a line with the pupilla, at the external canthus, with a cataract needle, and continued it in this

* Memoires de l'Academie des Sciences, 1707.

direction 'till it passed through the opposite side of this coat. The side of a fine scissars was introduced into the first aperture, and the inferior half of the cornea was divided near the sclerotica; another needle opened the crystalline membrane, and by a gentle pressure on the globe of the eye the cataract slipped into the aqueous chamber, and so down the cheek. Such in a few words is Monf. Daviel's account of this operation. Succeeding writers have laboured to reduce the operation to greater simplicity; for it was found that, besides the cicatrice from the wound, the squeezing of the blades of the scissars added considerably to the opacity. A simple instrument, something like an iris knife, has been recommended, and is generally used, to perform the entire incision of the cornea with.

† M. LA FAYE directs the cornea to be pierced at about half a line from the sclerotica, and to push it on in a straight line 'till it passes through the opposite side, when by a single inclination of the instrument the inferior half of the cornea is at once divided; nor need you fear, says he, to hurt the iris in traversing the cornea, AS IT IS PLANE OR FLAT IN ITS SURFACE, as Dr. Petel demonstrated in the Memoirs of the Academy of Sciences for 1728. Mr. Warner* would have the knife to be *suddenly and resolutely* pushed through the cornea, and passed in a straight line

† Mem. de l'Academie de Chirurgie, tom. vi. p. 304.

* Description of the Eye, p. 101.

to the other side. Such are the directions given by Sharp †, Bertrandi §, and all subsequent writers.

NEVER was operation received with greater applause, or more speedily and universally adopted for thirty years past, than the present. The avidity with which it was embraced proves but too truly the difficulty and uncertainty of that by depression, and *the utility and necessity of the present memoir*. For, notwithstanding all that has been said in its favour, I am not afraid to affirm, THAT NEVER WAS OPERATION LESS ENTITLED TO PUBLIC ESTIMATION. This declaration is not the result of theory and speculation, but of sound practice. I have myself performed it both with the scissors as Daviel recommends, and with a knife of my own invention, and have frequently seen it performed by others, and never with success adequate to expectations. For, in the first instance, the semisection of the cornea leaves a cicatrice, by which nearly half of it becomes opaque, at least the rays of light cannot distinctly pass through it. But besides this defect, unavoidable by the directions given, there are other still more alarming accidents to be apprehended from the very manner of piercing the cornea. We see La Faye recommends the needle to proceed in a straight line from one side to the other, without fear of wounding the iris, which he tells you is FLAT. Warner desires it to be passed *suddenly and resolutely*; and such is too much

† Philosoph. Transactions for 1753.

§ Traité des Operations de Chirurgie, p. 345.

the practice. What are the consequences of this rule? That the iris must infallibly be wounded; and this accounts for the complaints ON ALL SIDES, that a part, sometimes the whole, of the vitreous humour is discharged with the crystalline. Examine the projection of the iris and crystalline in the annexed plates, and you must subscribe to this melancholy truth: But that no doubt should remain, let it be remembered that if the iris be not wounded no particle of the vitreous humour can escape by moderately pressing on the globe, after opening the cornea. We have already noted that the anterior part of this humour is covered by a strong membrane, firmly adhering to the processus ciliares, except where it forms a sheath for the crystalline; what then can pass through the pupilla by pressure but this crystalline? The vitreous membrane, and the adhesion of the iris to it, oppose any other, except the pressure be too strong; but even in this case *the cataract must pass through first*. If then a part of the vitreous humour escape, and a distorted iris follow, we must attribute both to an absolute misconception of the structure of the parts, and to erroneous rules, the consequence of it. Thus we see, besides the unavoidable cicatrice of the cornea, other and more alarming dangers are to be feared, even to the total loss of sight, notwithstanding the cataract is removed.

BUT may not the structure of the parts furnish some hints to render this operation more safe and certain? From a careful perusal of the foregoing very accurate description of them, I think it will; and the following is the *modus* I would recommend. My knife is of the same size and figure of those used in this operation,

tion, except that it cuts at both sides from its point, and that the incisive parts are a little convex, the concave or inside of which should be marked in the handle. With the concave part next me, I pierce the *SCLEROTICA*, very near the edge of the *CORNEA*—suppose the third of a line—at either the external or internal canthus, according to the eye to be operated on. Instead of pushing it on in a straight line, as recommended, I direct the point rather a little towards the aqueous chamber than the iris, for fear of wounding this last, which its rising convexity exposes it to. The passage of the needle is proved by part of the aqueous humour's escape, and by your seeing its point, within the cornea, between it and the iris. You now incise the inferior side of the *sclerotica*, advancing the incision to the edge of the *cornea* *transparens*, as the adherence between the iris and *sclerotica* approaches closer to the cornea, the farther you go from the sides of the eye. Without withdrawing the instrument you cut the upper side of the *sclerotica* in the same manner. The reason why the inferior incision is first performed is, that if you cut the upper side first a little blood might oppose your carrying this inferior opening so very accurately afterwards. Thus nearly one side of the *sclerotica* from top to bottom, at its junction with the cornea, becomes divided; with the point of this very instrument you prick the crystalline capsula, and the smallest inclination of it inside the pupilla will do this, and then gently press on the globe of the eye, the cataract will instantly slip out, and though divided into parts, as it is sometimes, will with the greatest facility be extracted through the aperture.

By this simple mode of operating very little if any opacity can appear on the cornea ; and though some may, yet as it is at its very edge from whence the rays of light seldom are transmitted to the bottom of the eye, no defect can follow ; whereas by incising half the cornea from side to side, and not confining the opening to its extremity, a very great opacity remains. I have made no allowance for the escape of the vitreous humour, because it cannot possibly happen except the iris is wounded, and a very little attention will ever prevent that.